Chapter 7 Polynomial Functions

7-1 Polynomial Functions

ex

$7z^3 - 4z^2 + z$

Degree? 3 (In one variable)

Leading coefficient? 7

ex

$9y - 3y^2 + 4y^4$

Degree? 4

Leading coefficient? 4

ex

$3c^2 + 4c - 2c^{-1}$

Not polynomial

Degree?_____

Leading coefficient?_____

$f(x) = 3x^2 - 3x + 1$

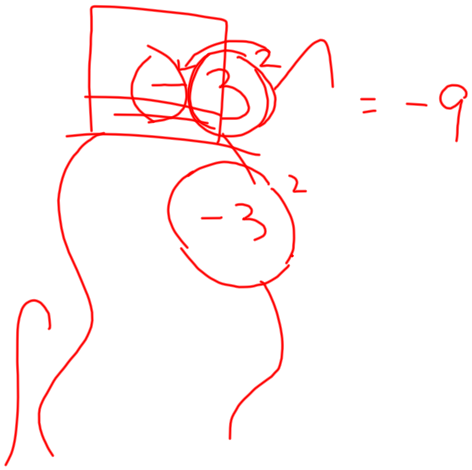
$f(2) = 3(2)^2 - 3(2) + 1$

$12 - 6 + 1 = 7$

$f(-3) = 3(-3)^2 - 3(-3) + 1$

$27 + 9 + 1$

$= 37$



$p(x) = 2x^4 - x^3 + 3x$

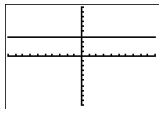
$p(-2) = 2(-2)^4 - (-2)^3 + 3(-2)$

$32 + 8 - 6$

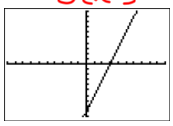
$= 34$

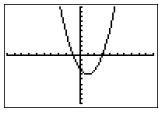
Graphs of functions		Degree
Constant	$f(x) = 4$	0
Linear	$f(x) = 3x - 9$	1
Quadratic	$f(x) = x^2 - 2x - 3$	2
Cubic	$f(x) = x^3$	3
Quartic	$f(x) = x^4$	4
Quintic	$f(x) = x^5$	5

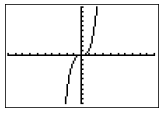
even

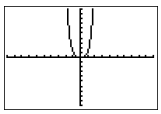

Constant

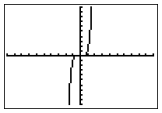
odds


linear


quad.


cubic


quartic


quintic

Let's look at the end behavior.

End Behavior- -behavior of graph as x approaches + ∞ and - ∞

even degree → same end beh.

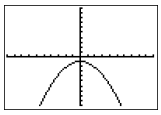
odd degree → opposite end beh.

Determined by degree and leading coefficient

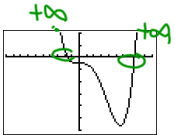
Summary

Even	Odd	Even	Odd
leading coeff +	+	-	-
+∞ +∞	+∞ -∞	-∞ -∞	+∞ -∞

Examples
a. Describe the end behavior.
b. Is the function odd or even?
c. State the number of zeros.

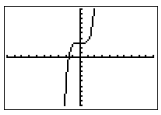


a. As x $\longrightarrow -\infty$ then f(x) $\longrightarrow -\infty$
As x $\longrightarrow +\infty$ then f(x) $\longrightarrow -\infty$
b. even
c. 0

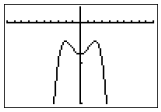


a. As x $\longrightarrow -\infty$ then f(x) $\longrightarrow +\infty$
As x $\longrightarrow +\infty$ then f(x) $\longrightarrow +\infty$
b. even
c. 2

Examples
a. Describe the end behavior.
b. Is the function odd or even?
c. State the number of zeros.



a. As x $\longrightarrow -\infty$ then f(x) $\longrightarrow +\infty$
As x $\longrightarrow +\infty$ then f(x) $\longrightarrow -\infty$
b. odd
c. 1



a. As x $\longrightarrow -\infty$ then f(x) $\longrightarrow -\infty$
As x $\longrightarrow +\infty$ then f(x) $\longrightarrow -\infty$
b. even
c. 0

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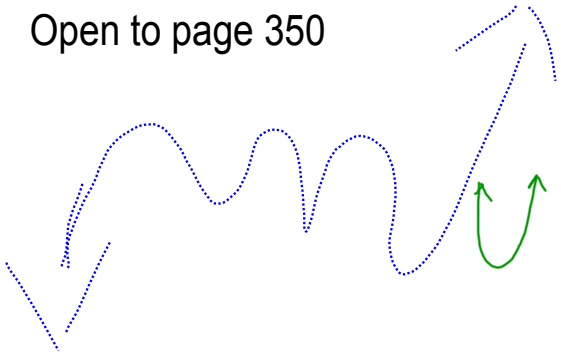

HW
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